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A NEW SUBSPECIES OF *COLIAS PALAENO*  
(LINNAEUS) FROM BAFFIN ISLAND, N.W.T.,  
CANADA (PIERIDAE)<sup>1</sup>

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IN 1973, THE SENIOR AUTHOR RECEIVED a small number of dark *Colias palaeno* (Linnaeus) from the vicinity of Frobisher Bay, Baffin Island, Northwest Territories. In 1975 and again in 1976, additional specimens were received from the same locality. When examination specimens were sent to C. F. dos Passos, C. D. Ferris and the late Colin Wyatt, all agreed that the Frobisher *Colias* were indeed a new form of *palaeno* as described below.

Although dos Passos cited nominate *palaeno* in his 1964 Checklist, it is a European species as noted by Klots 1951, 1975 (in Howe). To date, all North American *palaeno* have been referred to subspecies *chippewa* Edwards [TL Restricted by F. M. Brown, 1973 to west end of Great Slave Lake, Northwest Territory, Canada]. The species is Holarctic and the range of *chippewa* in North America extends from Alaska across arctic and subarctic Canada to Labrador. Baffin Island, in which Frobisher Bay is situated, is of significant size and is physically removed from mainland North America. It is not surprising, then, that an isolated race of *palaeno* should develop under such conditions. The new subspecies is now described.

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*Colias palaeno baffinensis* Ebner and Ferris, new subspecies  
Holotype Male: Frobisher Bay, Baffin Island, N.W.T., Canada, 10-viii-73. Expanse: 18 mm.

Allotype Female (white form): Frobisher Bay, Baffin Island, N.W.T., Canada, 19-viii-76. Expanse: 21 mm.

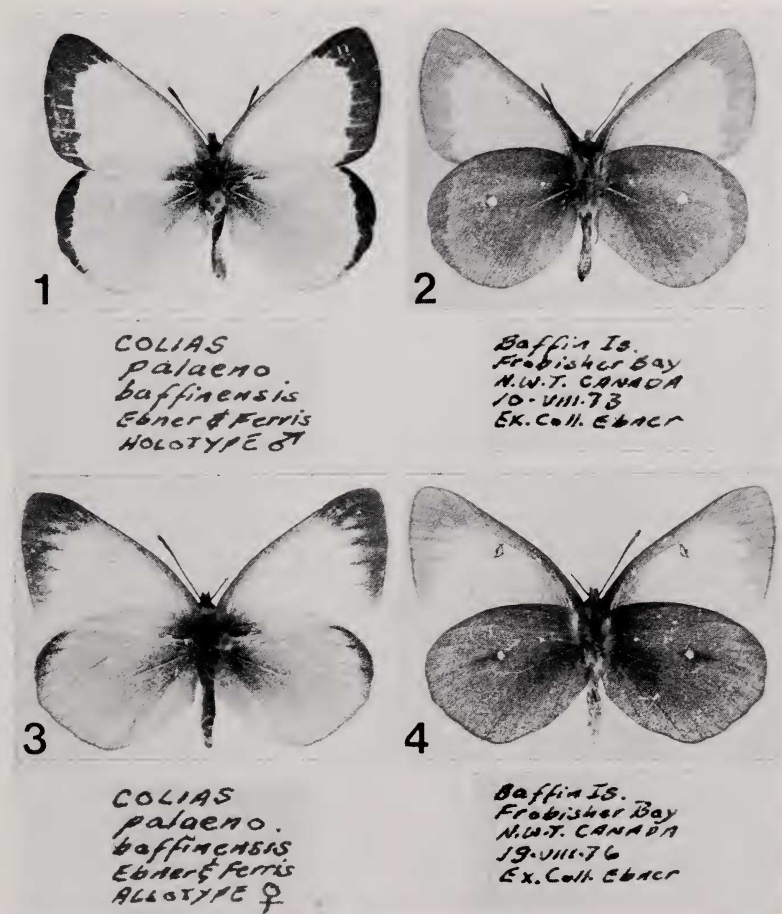
The holotype and allotype will be placed in the collection of the American Museum of Natural History, New York, N.Y.

Paratypes: 17 specimens, 9-12-viii-73; 54 males and 38 females 7-31-vii-75; 13 males and 4 females 26-vii-19-viii-76, all from Frobisher Bay, Baffin Island, N.W.T., Canada. All material is from the vicinity of the town of Frobisher Bay.

Paratypes are being distributed to the National Museum of Natural History, Washington, D.C. and the Canadian National Collection, Ottawa, Ontario, Canada. Additional paratypes are placed in the collections of the authors, C. F. dos Passos, Oscar Dorfmann, Gerald Hilchie and others. The Colin Wyatt collection contains examples of the new subspecies.

#### Figures 1 - 4

Diagnosis: The new subspecies differs from *chippewa* and the European and Japanese subspecies in the very narrow black borders of the males. This character is consistent and unvarying. The ratio of the wing width (measurement along the FW costal margin) to the border width at vein  $Cu_2$  is 7.4:1 in the male holotype of *baffinensis*; in the specimen of *chippewa* illustrated (Fig. 5), this ratio is 6.1:1. These values are typical of the two subspecies. The white ground color of the females is generally a more greenish white than in *chippewa* and the dark markings tend to be more intense. Ventrally the hindwings in both sexes exhibit much more dark suffusion than is found in *chippewa* or the European and Japanese races, and the HW discocellular spot is strongly rimmed with dark pink scales not found in the other subspecies. This melanic condition appears to be genetic and not related to thermo-regulation, as the melanism exhibited does not occur in *chippewa* taken in other localities at the same or higher latitude. The ventral surfaces are much darker than the specimen of *chippewa* figured by Howe (1975, Pl. 73, f. 15). Two subspecies are recorded from western Europe: *palaeno* Linnaeus and *europome* Esper (Higgins & Riley, 1975). The latter is more brightly colored and the black border in the males is usually slightly wider than in typical *palaeno*. Specimens are shown in Figures 7-8. Nominate *palaeno* occurs in Fennoscandia, while *europome* ranges through portions of France and Germany



## EXPLANATION OF FIGURES

Figure 1.—Holotype male, *Colias palaeno baffinensis* Ebner and Ferris, Frobisher Bay (town), N.W.T., 10-viii-73, upper side. Label is red imprinted with black ink. Figure 2.—Holotype male, underside. Label is white imprinted with black ink.

Figure 3.—Allotype female, *C. p. baffinensis*, Frobisher Bay (town), N.W.T., 19-xiii-76, upper side. Label is green imprinted with black ink. Figure 4.—Allotype female, under side. Label is white imprinted with black ink.

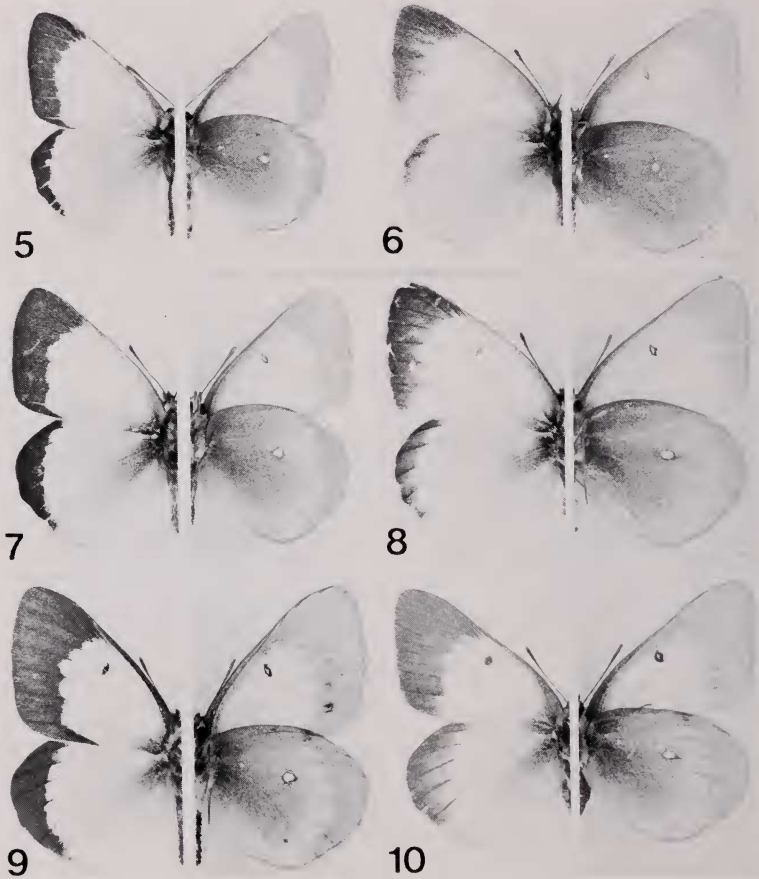


Figure 5.—*C. p. chippewa*, male, Churchill, Manitoba, 11-vii-73, upper and under sides. Figure 6.—*C. p. chippewa*, female, same data as male in Fig. 5, upper and under sides. Fig 7.—*C. p. palaeno*, male, Les Fonts, H.A., France 2000 m, 20-vii-68, upper and under sides. Fig 8.—*C. p. palaeno*, female, same data as male in Fig. 7, upper and under sides. Figure 9.—*C. p. aias*, male, Asama Mts., Nagano, Japan, 2200 m, 24-vii-74, upper and under sides. Figure 10.—*C. p. aias*, female, Mt. Asama, Nagano, Japan, 2200 m, 23-vii-56, upper and under sides.

to Rumania. Various forms have been described which have been elevated to subspecific status by some workers. Petersen (1947) has discussed the variation that occurs in Scandinavian populations. Two *palaeno* subspecies are known from Japan. The larger and more heavily marked *aias* Fruhstorfer (Figures 9-10) occurs in the mountains of central Honshu, while *sugitani* Esaki is found in the Japanese Alps in the western portion of central Honshu. The differences between these two subspecies are slight.

Description: Male. DFW: uniformly dull yellow, discal spot usually absent, but sometimes faintly indicated; narrow dark borders widest at apex and uniformly black to inner margin; variable in breadth, and sometimes lightly invaded by light streaks along veins. Fringes pink with costal margin thinly outlined in gray-black, occasionally pink. Basal area near thorax dark.

DHW: dull yellow, tending to be more greenish than FW. Dorsal discocellular spot always evident and pronounced as a cream colored spot; black borders uniformly dark, always less in breadth than primaries and occasionally interrupted with lighter streaks along veins. Fringes pink, more pronounced along inner margin and adjoining outer margin. Basal area darkly suffused and radiating discally more extensively than in primaries.

VFW: less yellow than above, tending toward white along tornus to inner margin; dorsal margins apparent. Pink fringes more contrasted; pink costal margin with inward dark suffusion. Discal cell spot occasionally present; macular spots rare.

VHW: strongly contrasting with ground color of FW, dark olive green with intense dark suffusion throughout. Discal cell spot always well-developed, usually strongly rimmed with dark pink to brownish-red, occasionally dagger-shaped as in *C. hecla* Lefèbre. Discocellular spot much larger than in *chippewa*, more angular. Fringes pink.

Antennae red-brown above and beneath, pink with club bright yellow. Eyes brown to brownish-black.

Expanse: base of primary-to-apex: 17-21 mm.

Female. Dimorphic: white form prevalent (3.75:1 ratio) with some specimens intermediate between white and yellow. Of 43 females examined, 30 were white, 8 were yellow and 5 were intermediate.

DFW: white form: uniformly gray-white. Discal cell spot absent or inconspicuously present. Dark marginal border always

widest at apex, but variable in breadth, sometimes containing several light markings, either enclosed partially or completely by a dark band. Fringes pink. Basal area dark brown at thorax. Costal margin thinly lined with pink edge and sometimes suffused lightly with dark scales.

DHW: white form: contrasts slightly with FW, usually a more bluish-gray. Discal spot always evident and cream colored. Outer marginal black border narrow and always slightly developed. Fringes pink.

VFW: white form: more glossy white than DFW; apical area conspicuously tinged with greenish-yellow. Costal margin lined thinly in pink; fringes pink.

VHW: white form: uniformly dark gray-green. Discal spot prominent and sometimes silvery. Red-brown rimming usually strongly evident, but slightly evident in some examples, occasionally dagger-shaped. Fringes pink and prominent.

Antennae and eyes as in males. Thoracic hairs at base of FW strongly pink.

Expanse: 19-23 mm.

The yellow form is essentially identical to the white form, but with all of the white areas replaced by pale yellow.

Variation: Geographic variation cannot be considered, as all of the specimens have been taken in the same locality. Except for sexual dimorphism, the subspecies shows remarkably little variation. The observed variation relates to the shape of the VHW discocellular spot as noted above and the dorsal coloration in the males, which in a very few examples is a dark yellow. A female *Colias* specimen from Frobisher Bay appeared to reflect a hybrid between *hecla* and *palaeno*. The ground color was quite orange, but the dark markings were characteristic of *palaeno*.

Some specimens of *palaeno* from both Coppermine and Baker Lake, N.W.T. appear to be intermediate between *chippewa* and *baffinensis*. The dark rimming of the VHW discocellular spot is more prominent than in *chippewa*.

Baffin Island is one of the few areas in North America where *pelidne* Boisduval & LeConte and *palaeno* come into contact. Hovanitz (1950) discussed Baffin Island *pelidne* but *palaeno* was not recorded from the area. The dot on his distribution map (Figure 4) occurs in the vicinity of Lake Harbour which is west of both the town of Frobisher Bay and the body of water bearing the same name. Rare examples of *pelidne* phenotypes occur

in the vicinity of the town of Frobisher Bay and may represent migrants from a colony elsewhere on the island. In one character, the strongly rimmed discocellular spot, *baffinensis* is intermediate between the two species. In all other characters, however, it is clearly *palaeno*. Perhaps weak introgressive hybridization in the past has contributed to the discocellular spot character.

**Bionomic Notes:** The life history of *baffinensis* is unknown. Because of its swift and low flight, the butterflies are difficult to capture. It appears restricted to the lower elevations of the hills which surround Frobisher Bay. The butterflies occur in mixed dry-wet areas on slopes ranging from 300-500 feet (100-160 m) in elevation. They are absent from the hill tops and the dry lower regions of the slopes.

Arctic Cotton (*Eriophorum* sp., Cyperaceae), Fire Weed and Willow Herb (*Epilobium* sp., Onagraceae) grow in the general areas where *baffinensis* flies. It is sympatric with *C. nastes* Boisduval & LeConte and *hecla*. Five species of *Boloria* occur in the region along with *Lycaena phlaeas feildeni* (M'Lachlan) and *Plebejus aquilo* (Boisduval). In the higher and drier areas where *baffinensis* does not occur, *Erebia rossii* (Curtis) and two species of *Oeneis* may be taken.

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